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A
PROBATIONARY ESSAY
ON
PURULENT DEPOSITS

AFTER
WOUNDS AND OPERATIONS;
SUBMITTED,

BY AUTHORITY OF THE PRESIDENT AND HIS COUNCIL,

TO THE EXAMINATION OF THE

Royal College of Surgeons of Edinburgh,

WHEN CANDIDATE

FOR ADMISSION INTO THEIR BODY,

IN CONFORMITY TO THEIR REGULATIONS RESPECTING THE
ADMISSION OF ORDINARY FELLOWS.

BY

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PLINIAN SOCIETIES, EDINBURGH.

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TO

THE REV. JAMES BREWSTER,

MINISTER OF CRAIG,

THE EARLY AND CONSTANT FRIEND OF HIS FATHER,

THE FOLLOWING ESSAY

IS DEDICATED,

IN TESTIMONY OF THE HIGHEST ESTEEM AND RESPECT OF

THE AUTHOR.

THIS ESSAY

IS ALSO INSCRIBED,

IN GRATEFUL AND AFFECTIONATE RECOLLECTION,

TO THE MEMORY OF THE LATE


DR. JAMES CRAUFURD GREGORY,

WHOSE TALENTS WERE ADMIRIED,

AND WHOSE PREMATURE DEATH WAS LAMENTED,

BY NONE MORE SINCERELY THAN BY

THE AUTHOR.



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ON
PURULENT DEPOSITS
AFTER
WOUNDS AND OPERATIONS.

INTRODUCTION.

COLLECTIONS of matter are occasionally found in different situations consecutively to the suppuration produced by inflammatory action in some distant part. In some cases the formation of these collections is easily accounted for, and we can trace an evident communication between the original suppurating surface and the part to which the purulent matter has been conveyed. Thus, an abscess of the liver, or, as I have seen in one instance, a lumbar abscess, may, by perforating the diaphragm, discharge its contents into the sac of the pleura. These abscesses are, by some authors, denominated *symptomatic*.¹

In other cases depositions of pus take place, which

¹ Copland's Dictionary of Practical Medicine. *Article Abscess*, p. 15.

we are unable to refer to any such obvious cause. To abscesses of this kind consequent upon wounds and operations, situated in parts distant from the original injury, and between which there exists no direct communication, the term *consecutive* has been applied by some writers,¹ while others have noticed them under the denomination of *metastatic* abscesses.² Both appellations seem to me objectionable, more especially the latter, which involves a theory not applicable to every case.

Instances are mentioned by Galen,³ Scultetus,⁴ Paré,⁵ Belloste,⁶ Quesnay,⁷ Buttner,⁸ and others, in which the sudden disappearance of abscesses, and the cessation of purulent discharges, have been accom-

¹ Copland's Dict. p. 16.

² Dictionnaire des Sciences Médicales, 2de Edit. tom. i. *Art.* Abcès Métastatiques.

³ Galen, De locis affectis. Lib. vi. cap. 4.

⁴ Scultetus, quoted by Belloste, Armamentar. Chirurg. Obs. lxi. p. 245.

⁵ Œuvres d'Ambroise Paré, Lib. xvii. chap. 51. p. 413. fol. Lyon, 1652.

⁶ Belloste, Chirurg. d'Hôpital, Part. iii. chap. xv. p. 264, quoted by Van Swieten, Comment. tom. i. p. 706. 4to. Hildburg. 1747.

⁷ Quesnay, Traité de la Suppuration, p. 25, Paris, 1749.—Ephem. Nat. Cur. Decur. iii. Ann. v. et vi. p. 131.

⁸ Buttner, Dict. des Sciences Médicales, tom. xxxiii. p. 26. *Art.* Métastase.

panied with evacuations of pus by the bladder and rectum ; and a case is related by M. J. C. Sabatier¹ as having occurred to M. Roux at La Charité in the winter of 1831–32, in which a large collection of matter suddenly disappeared from the axilla on the formation of an abscess in the hip.²

To such cases as these, which in general are very equivocal, and rest chiefly on the authority of old authors, the appellation of *purulent metastases*, or *metastatic abscesses*, may perhaps with propriety be applied ; but they differ completely from those to which I mean at present to allude.

In the following observations my attention shall be principally directed to those purulent deposits which are rapidly formed in distant parts of the body after various wounds and surgical operations ; and, although I am not entitled to speak from much personal observation, I shall endeavour to profit by the experience of others.

The subject has led to considerable inquiry in re-

¹ J. C. Sabatier, Thèse sur les Métastases Purulentes, p. 8. Paris, 1832.

² See also Alix, *Observata Chirurgica*, fasc. i. Observ. xiv. p. 65. Altenburgi, 1774. “ Abscessus parotidum metastaticus, ejusque sequelae.”—Bromfield’s *Chirurgical Observations and Cases*, vol. i. p. 89. Lond. 1773.—Gastellier, *Journal de Médecine*, cont. tom. v. p. 400.

cent times, and several valuable treatises have been written upon it ; but notwithstanding the researches of Velpeau, Blandin, Maréchal, Bouillaud, Ribes, Dance, Rose, Arnott, and others, it is still involved in much obscurity. There is considerable discrepancy in the opinions of these authors, and in the interpretation they give of the phenomena which they have observed ; and after a careful examination of all the facts which have been collected, we have much difficulty in coming to a satisfactory result.

As these purulent deposits frequently interfere with the success of the most ably performed operations, they particularly deserve the attention of the practical surgeon. They are frequently connected with a peculiar irritability of constitution, to a judicious attention to which he may be indebted not a little for the prosperous issue of his most trivial as well as his most important operations.

NARRATIVE OF CASES.

As it is only by a careful observation of the symptoms exhibited by any disease, and the pathological phenomena displayed on dissection, that we are enabled to draw correct conclusions in regard to it, I shall, in the first place, detail several cases illustrative of the manner in which purulent deposits are formed in the various situations in which they have been detected.

I. PURULENT DEPOSITS AFTER VENESECTION.

For the two following cases I am indebted to the kindness of Dr. Alison.

Case I.—Mary Banks, forty years of age, unmarried, admitted into the Royal Infirmary of Edinburgh on the 11th of April 1832.

Complains of pain and tenderness of abdomen, unaccompanied with distension or any distinct hardness. Descent of the diaphragm somewhat impeded ; pulse 96, full ; tongue pretty clean and moist ; some dysuria. States that pain of abdomen commenced thirteen days ago, and that she has been

bled three times without much relief.—On admission, eight ounces of blood were taken from the arm, producing faintness ; an emollient enema and pills of calomel and opium were administered.

Next day, as the pain and tenderness of the abdomen continued with nausea and vomiting, eighteen leeches were applied, and effervescing draughts with anodyne enemata were prescribed.

On the 13th, she still complained of the pain of abdomen, accompanied with vomiting and some distension. Twelve ounces of blood were therefore taken from the left arm, fomentations were applied to the abdomen, and the pills of calomel and opium repeated.

14th. Blood slightly sizy ; three stools of natural colour ; abdomen still tender and rather more distended ; no vomiting ; pulse 90, of good strength.—Twelve leeches to be applied to the abdomen and the other remedies continued.

15th. Leeches did not bleed well ; pain of abdomen still felt on pressure or coughing, but much abated ; still occasional nausea and vomiting ; less distension of abdomen ; pulse 96, of moderate strength ; one scanty stool ; slight inflammation at the orifice of the vein from which she was bled.—A draught of castor oil given, an emollient poultice applied to the arm, and the fomentations of the abdomen continued.

16th. Several stools from the oil with some grip-

ing ; pain and tenderness of abdomen abated, but not gone ; still occasional bilious vomiting ; had some shivering yesterday ; pulse 108, firm ; tongue slightly furred ; much thirst ; inflammation of left arm much extended, but no tenderness along the course of the vein.—Nine leeches applied to the arm, effervescing saline draughts given occasionally, and an anodyne enema administered.

17th. Leeches bled well ; painful swelling of arm somewhat extended ; no hardness felt along the vein ; pulse 116, firm ; tongue whitish ; some headach and heat of skin ; abdomen easy since the enema ; no stool.—A draught of castor oil given, and several punctures made in the arm.

18th. Little blood discharged from the punctures ; painful swelling somewhat extended ; no hardness felt along the vein ; had painful diarrhœa last night, which was checked by acetate of lead and opium ; pulse 120, of moderate strength ; skin warm and dry ; tongue furred ; thirst and occasional vomiting.—Twelve leeches applied to the arm, and a draught of castor oil with a few drops of the solution of the muriate of morphia given.

19th. Leeches bled much ; has still pain of forearm, with tenderness along the vein ; diarrhœa returned last night, accompanied with much vomiting ; complains of cough and oppression under the ster-

num, with some mucous expectoration ; pulse 120, small and weak ; tongue slightly furred, moist ; has still rigors ; thirst increased ; no delirium.—Eight leeches applied to the arm, calomel and opium repeated, and three ounces of wine ordered.

20th. Leeches bled well ; less cough ; vomiting rather abated ; several stools ; hardness felt along the vein ; little pain in the arm, but she complains of pain in the right knee-joint, where there is some tenderness but no swelling ; pulse 120, small and soft ; tongue dry, slightly furred ; no headach.—Calomel pills and effervescing powders continued ; six ounces of wine prescribed.

Pain of knee-joint, however, continued to increase, attended with considerable swelling ; pulse became very frequent and feeble, and she expired on the morning of the 21st.

22d. *Inspection*.—The lungs were slightly emphysematous. The convex surface of the liver adhered in several places to the diaphragm. The omentum was found to adhere to the bladder and to various parts of the intestines, between the folds of which numerous adhesions were also detected. A considerable quantity of purulent fluid was found between the rectum and the uterus, in a sort of bag formed by the adhesions of the peritoneum. The right Fallopian tube was greatly enlarged : the ex-

tremity of it nearest the uterus was obliterated, and, throughout the rest of its course, it was intersected by a series of fibrous bands. Its fimbriated extremity terminated in a large sac which was filled with pus. In the ovary of the same side there existed a small cyst containing some serous fluid, and to the extremity of the ovary was attached an oval tumor nearly an inch long, which, on being cut into, was found to contain coagulated blood. The cellular membrane of the left arm was generally hardened, but it was not disorganized, nor was there much effusion into it. The cephalic vein, as far as its entrance into the axillary, was thickened and contracted, and contained purulent matter. For a considerable way below the puncture the same appearances were exhibited. Some of the communicating veins were also thickened. A considerable quantity of purulent matter was effused into the right knee-joint, but there was no ulceration of its cartilages, and but little thickening of the synovial membrane.

Case II.—Helen Bonelly, æt. 32, admitted into the Royal Infirmary of Edinburgh on the 12th of April 1832.—Complains of severe pain in hypogastrium, aggravated by pressure and full inspiration, extending to both iliac regions, and occasionally affecting the right hip and the anterior part of the thigh. Complains also of pain and distension of

stomach, with some degree of nausea. Has frequent paroxysms of headach, with rigors, vertigo and tinnitus aurium. Catarrhal râles heard generally over the thorax, more especially on the right side. Occasional palpitation; catamenia irregular; pulse 104; tongue furred. There is an ulcer on the inner malleolus, which has been discharging more or less for ten years.

Was attacked two months ago with pain of hypogastrium, accompanied with hæmaturia, for which she was bled several times with complete relief. Six days ago her present complaints commenced, and have continued to increase, notwithstanding the employment of blood-letting, and the application of a blister to the left iliac region.

On admission, twelve ounces of blood were taken from her right arm; enemata and purgative medicines were administered, and fomentations applied to the abdomen.

On the 14th, as the pain of the hypogastrium continued, ten leeches were applied with relief. An emollient and afterwards an anodyne enema was administered, and pills of calomel and hyoscyamus were prescribed.

15th. One copious stool from enema; pain of abdomen gone. Since morning she has had pain and swelling of right arm, extending from the punc-

ture in the vein in all directions. Ten leeches have been applied which bled well with relief. Rigors and headach ; pulse 140, full and very soft ; tongue white and moist.—A dose of calomel and jalap was prescribed, followed by saline laxatives, and twelve leeches were applied to the arm.

16th. Leeches bled profusely ; general swelling of arm has abated, but hardness is felt along the course of the vein. On account of great faintness a little wine has been given. Pulse 120, soft ; tongue foul, moist ; no return of rigors ; much drowsiness ; no delirium ; two stools ; no return of abdominal pain.—Ten leeches applied to the arm, followed by an emollient cataplasm and some purgative medicine. Four ounces of wine were also prescribed.

17th. Leeches bled well ; hardness still felt along the course of the vein, but there is less tenderness ; had a return of shivering last night, followed by severe pain in right knee, which is somewhat swelled this morning. Six leeches have been applied to the knee with some relief. Several dark-coloured stools ; pulse 120, very soft ; tongue white, moist ; headach less severe.—Effervescing powders prescribed, and an anodyne draught at bed-time. Three ounces of wine.

18th. Swelling and tenderness of arm much abated ; pain and swelling of knee diminished ;

complains of pain of right foot unaccompanied with swelling; pulse 130, of moderate strength; tongue rather dry; skin warm; no delirium; sleeps little.—Twelve leeches were now applied to the foot, and the purgative medicine and anodyne draught repeated; wine continued.

19th. Pain of foot gone since the leeching; still some painful swelling of arm, not confined to the course of the vein; had a restless night and is very drowsy; pulse 120, soft; skin warm and dry; tongue parched; no delirium; no stool.—Cathartics were given and wine continued.

20th. Three stools from medicine; has had much delirium, and is now nearly comatose; pulse very frequent, scarcely perceptible; tongue dry; general swelling and hardness of arm increased; complained of pain of both wrists, which are slightly swelled. Expired in the afternoon.

Inspection, twenty-two hours after death.—There was effusion of serum, but no pus, in the cellular substance of the right arm. The cephalic vein exhibited distinct marks of inflammation, which extended for a considerable way below the puncture, and upwards as far as its junction with the deep veins. Some pus, but no lymph, was found in it. The right knee-joint was filled with pus, but its cartilages were not ulcerated. The synovial

membrane was thickened and rough. The veins of the leg corresponding to the old ulcer were thickened and enlarged. A large quantity of synovia existed in the right ankle-joint. No particular disease of the viscera of the thorax or abdomen. The brain was soft, and the ventricles contained more serosity than usual. A small encysted tubercle was found in the grey matter of the corpus striatum.

Another case of a similar nature occurred at the same time in one of the Clinical Wards of the Infirmary. The patient recovered after a tedious illness, in the course of which pus was formed in different parts of the arm, but not in any of the joints or internal organs. The treatment was similar to that pursued in the two fatal cases which I have detailed.

Numerous similar cases are noticed by authors.

Case III.—One is related by Mr. Arnott,¹ in which inflammation of the cephalic vein came on three days after bleeding, succeeded by severe shivering fits, and great febrile excitement. The arm and left knee-joint became painful and swollen, and the patient ultimately fell into a typhoid state, accompanied with a peculiar yellowness of the countenance, and he died on the sixteenth day after the bleeding.

On dissection, the cephalic vein was thickened, and contained pus for about two inches below and

¹ Medico-Chirurgical Transactions of London, vol. xv. p. 18.

four above the wound. There was an increased quantity of fluid in the ventricles of the brain, and some opacity of the arachnoid. The cavity of the left knee-joint was filled with tolerably thick pus of an uniformly reddish colour. The synovial membrane extremely vascular and thickened, with an irregular and almost villous surface. Considerable absorption of the cartilages covering the femur and tibia.

Case IV.—In another case quoted by the same author,¹ in which phlebitis supervened on venesection, and the patient died seven days after the puncture, there was found on dissection pus throughout the whole length of the vein, eight or ten ounces of yellowish opaque serosity in the right sac of the pleura, and in both lungs hepatized portions varying in size from that of a nut to that of a large walnut, gorged with fluid, which in some of them was puriform.

For the particulars of the next case I am indebted to Sir George Ballingall, under whose care it occurred.

Case V.—Mary Torrance, ætat. 18, was admitted into the Surgical Wards of the Edinburgh Royal Infirmary on the 3d of December 1827, on account of inflammation of the arm, consequent on venesection, which had been performed eight days before admission. She complained of much pain

¹ Lond. Medico-Chirurg. Trans. vol. xv. p. 20.

in the forearm, the integuments of which, for about two inches below the elbow, were inflamed and painful on pressure. Pulse 120 ; tongue furred ; skin hot ; appetite bad.—Twenty-four leeches were applied to the arm, followed by a poultice ; purgatives and antimonials were administered.

On the evening of the 4th she was attacked with pain of the left wrist, and on the 5th, with pain of both ankles and of one knee, which were all slightly swelled and hotter than natural. Pulse 120, strong ; tongue furred, rather dry ; bowels open ; skin hot ; very great thirst.—Was bled to twenty ounces with some relief to left wrist, and afterwards took a full dose of laudanum in a diaphoretic draught.

Pain of left ankle still continued severe, and on the 7th, twenty leeches were applied to it, which bled well with some relief. Pulse 130 ; tongue furred, dry ; complains chiefly of pain of right knee.—Twelve leeches were now applied to the knee ; the saline antimonial medicine being continued.

Symptoms continued nearly the same till the 11th, when the report was : Slept ill ; pulse 132 ; tongue furred and dry ; two stools ; swelling of right leg and ankle much less ; heat of left ankle considerably increased.

13th. Slept much ; had profuse sweating during the night and this morning ; appears to be in a co-

matose state, and is unable to give answers to questions put to her ; pulse 160, and very feeble. Wine was given, but she continued to sink, and died at half past three in the afternoon.

On dissection, the veins of the arm appeared to be in a healthy state. The cavity of the joint of the right knee was filled with pus, as were also those of both ankle-joints, and there was a considerable collection of pus under the fascia and above the elbow-joint. The synovial membrane of the right knee was slightly inflamed and thickened. The synovial membrane of the ankle-joints was quite sound and healthy.

Deposits in different situations have frequently taken place also from ligature of veins, an operation generally attended with great constitutional irritation and very alarming consequences.¹

II. PURULENT DEPOSITS AFTER THE INJECTION OF A SALINE SOLUTION INTO THE VEINS.

The following case occurred under the care of my late lamented friend Dr. J. C. Gregory.

¹ Cooper's and Travers' Surgical Essays. vol. i. p. 216 et seq. — Transactions of King's and Queen's College of Physicians in Ireland, vol. ii. p. 345.—Hodgson on Diseases of the Arteries and Veins, p. 551, &c.

Case VI.—Martha Smith, æt. 36, married, admitted into the Country Ward of the Royal Infirmary on the 21st of July 1832.—Her friends state, that she was seized with cholera on the 16th of May, and was treated by the injection of a saline solution into the vein of the left arm. Three days after the operation, she was delivered of a still-born child, and subsequently had a severe attack of phlebitis in the left arm. She seemed to be recovering from this, when she was suddenly seized with rigors, followed by pain and swelling of knee-joints.—Poultices, leeches and blisters have been applied.

She has now an anxious and depressed expression of countenance, and is extremely emaciated. There is considerable œdema of the legs. Both knee-joints are swollen, painful, and acutely tender, and give on manipulation a distinct feeling of fluctuation. The integuments are red, tense and glistening. Bowels regular ; tongue white, moist ; pulse 116, small and weak.

Notwithstanding the use of poultices, blisters, and wine, she continued gradually to sink, and died on the 4th of August.

Inspection.—There was some emphysema of the lungs, with signs of inflammation of the bronchial membrane. The abdominal viscera were healthy. On cutting into the knee-joints, a large quantity

of dark-coloured purulent matter escaped, mixed with air. Pus was also found effused between the muscles in the neighbourhood, extending in the right thigh as high as the trochanter minor. The synovial membrane of the joint had given way in both limbs, and communicated with the collection in the superior part of the limb. The articular surfaces of both joints were distinctly diseased, the bone being in some places bare.—No marks of phlebitis could be detected in the veins of the left arm.

III. PURULENT DEPOSITS AFTER COMPOUND FRACTURES.

*Case VII.*¹—In 1818, a young man, 18 years of age, received a compound fracture of his left leg, in consequence of a stone falling upon it. He was taken to the Hotel Dieu at Tours, and splints and bandages were applied. He did well for nine days, but on the tenth the wound began to discharge a great quantity of very fluid purulent matter. The extremities of the bone became bare. On the thirteenth day erysipelas attacked the leg, fever came

¹ Velpeau, Thèse sur quelques propositions de Médecine, p. 21. Paris, 1823.

on, and the discharge from the wound diminished. On the fifteenth day the patient became delirious, the erysipelas disappeared almost entirely, and the discharge from the wound ceased. Typhoid symptoms supervened, and he died on the morning of the eighteenth day.

Dissection.—The lungs, liver, spleen, brain, kidneys and heart contained numerous small circumscribed purulent deposits, varying in size from that of a pea to that of a nut. The texture of the organs around these abscesses was not inflamed, and scarcely differed in any respect from the natural condition.

*Case VIII.*¹—A man, æt. 35, was admitted, on the 25th of April 1830, into the Hôpital Beaujon, on account of a severe compound fracture of the right leg, which was with difficulty reduced after the external wound had been enlarged. In the course of a few days there was much suppuration from the wound. A degree of erysipelas made its appearance, and a portion of the bone became bare. On the 8th of May he had shiverings, which continued at intervals for two or three days, and were succeeded by heat of surface, frequency of pulse, dryness of tongue, and after-

¹ Danvin, Thèse sur quelques accidens très communs à la suite des suppurations aiguës, p. 14. Paris, 1831.

wards by diarrhœa. On the 22d, rigors again came on, followed by some sweating, and continued more or less for several days. On the 24th, the left side of the chest was observed to be dull on percussion, and the respiratory murmur was inaudible over the greater part of that side ; but there was neither pain of thorax, nor difficulty of breathing. Stools natural ; skin hot ; pulse frequent ; little suppuration from the wound.—Blisters were repeatedly applied to the chest.

On the 27th, the features are reported to have become collapsed ; tongue dry ; some vomiting ; abdomen tympanitic ; slight diarrhœa ; pulse frequent ; little heat of surface ; no discharge from the wound, the edges of which are pale.

28th. Conjunctivæ, and the whole surface of the body exhibits a deep yellow tinge ; other symptoms as before.

From this time the patient became rapidly worse, typhoid symptoms increased, and death took place on the 30th.

Dissection.—Several ounces of sero-purulent matter, with flocculi, were found in both cavities of the pleura. Numerous collections of pus were situated near the surface of both lungs. The pulmonary texture round these abscesses was in some places condensed, in others infiltrated. Abscesses were also detected in the liver, the parenchyma of

which was in many places of a slate-colour. On examining the limb, the fibula was found fractured near its upper extremity, and there was a comminuted fracture of the tibia near the middle. The femoral vein towards the middle of the thigh was filled with pus, its parietes being yellow and thickened. Pus was also found in several of the smaller veins of the thigh.

IV. PURULENT DEPOSITS AFTER AMPUTATION.

*Case IX.*¹—Robert Brockie, aged about 40, admitted into the Surgical Wards of the Infirmary on the 3d of May 1828. The following report is entered in the journal:—Was brought in about ten P.M., having fallen from a house four stories high in Dalkeith. There is a fracture of the tibia and fibula about an inch and a half above the ankle-joint; the lower portion of the bone appears to be driven under the other. There is likewise a fracture of the second phalanx of his thumb. The limb was placed on the suspending apparatus.

On the 8th, the skin surrounding the fracture had assumed a dusky red colour, and some vesica-

¹ Clinical Lectures delivered by Sir George Ballingall, in the Royal Infirmary of Edinburgh, No. IV. p. 9, July 1828.

tions had appeared. These appearances continued to spread up the leg, which soon became gangrenous.

12th. Mr. Liston removed the limb above the knee by the flap operation.

14th. Slept well; no pain of stump; complains of pain of chest, accompanied with troublesome cough; no pain on full inspiration; bowels open; tongue white and moist; pulse 82; perspires much; skin rather cold.

On the 15th, his skin became cold and clammy, and presented a peculiar yellow hue; his whole body had a disagreeable odour; pulse 55.—Diffusible stimuli were now prescribed.

19th. Very restless; frequent hiccup; two stools; little cough; breathing laborious; perspires much; pulse 74, full; some subsultus; much discharge from the stump.

23d. Complains of pain of breast, increased on full inspiration; frequent cough, with much tenacious expectoration; slept well; one natural stool; tongue loaded; pulse 96; less discharge from the stump.

In the space of two hours a sudden change took place; his breathing became laborious, he sunk rapidly, and died on the morning of the 24th.

25th. On examination of the body, the fourth

rib was found fractured about an inch from the cartilage, and a small quantity of pus was found exterior to the pleura costalis. The left lung was full of white tubercular bodies. Several abscesses were found in the liver, and the pericardium contained four ounces of bloody serum. A long coagulum was found in the femoral artery.

*Case X.*¹—William Laird, aged 32, was admitted into the Surgical Hospital on the 5th of April 1831, on account of caries of the tibia. The knee was considerably enlarged, and when pressure was made on it, pus flowed out at various openings in the leg. The limb was amputated by the double flap on the 7th; the muscles seemed as if separated from each other by dissection or putrefaction, and all the parts were so very much relaxed that the operation would have been better performed by a simple circular incision down to the bone. Next day the patient expressed satisfaction with his condition, as he had slept well, and was free from pain. Alarming symptoms of exhaustion then appeared, and he was stimulated frequently with small doses of whisky and warm water. On the second day he was in much the same state. On the third he was sunk down in bed; his countenance anxious;

¹ Professor Syme's Seventh Report of the Edinburgh Surgical Hospital. Edin. Med. and Surg. Journ. vol. xxxvi. p. 247.

tongue dry ; pulse 170 ; the stump shrunk, and secreting little matter. The bowels were opened by injection, and the stimulation continued. He rallied towards the evening, when his tongue became moist, and his pulse fell to 120. He looked and felt better. On the fourth day he continued in a more promising state, the stump also was improved in its condition ; on the fifth day he relapsed into his former weakness ; on the sixth he remained much the same ; and on the seventh he died.

On dissection, forty ounces of sero-purulent fluid were found in the left cavity of the chest. The corresponding lung was considerably condensed and sunk in water.

*Case XI.*¹—William Burnett, æt. 26, had been for five or six years constantly under medical treatment ; at one time for chronic inflammation of the peritoneum, at another for palpitation of the heart,—and for several months he had been an out-patient of the Surgical Hospital on account of disease in his foot, knee and wrist. His general health became considerably improved, and his local complaints seemed also to be in the way of improvement, with the exception of his foot, which swelled to a great size, suppurated in several places,

¹ Eighth Report of the Edin. Surg. Hosp. by Prof. Syme. Edin. Med. and Surg. Journal, vol. xxxvii. p. 327.

and when the matter was evacuated, the bones were felt extensively denuded. He complained of severe and incessant pain, which prevented him from sleeping, except when under the influence of the muriate of morphia. In short, he felt persuaded that the disease would certainly prove fatal before long, and therefore desired to be relieved from it, whatever might be the danger of the operation. It was accordingly performed on the 24th of January 1832. The tissues of the limb were observed to be soft and loosely connected. Great difficulty was experienced in arresting the hæmorrhage. The stump sloughed. No effort at reparation took place after the dead parts separated; and the patient, who preserved his appetite and confidence almost to the last, at length sunk under his sufferings on the 7th of February.

On dissection, the peritoneum was found almost everywhere studded with small tubercles, and having its surface generally adherent. The lungs were thickly interspersed with small tubercles. The wrist was filled with pus; and almost no part of the body presented the appearance of healthy structure.

*Case XII.*¹—Frederick Wells, a robust man, aged 25, had his right leg amputated in St.

¹ Lond. Med. Gazette, vol. ii. p. 127; quoted by Mr. Arnott in Lond. Medico-Chirurg. Trans. vol. xv. p. 72.

George's Hospital, by Mr. Rose, on the 9th of June 1828, four hours subsequent to an accident by which the metatarsal bones had been fractured and dislocated. Two days after the operation a degree of irritability and morbid quickness was observed in his answers, which increased. The stump did not unite, but assumed a sloughy appearance; he was restless; the complexion became sallow, the features pinched; he had rigors, and the pulse ranged from 100 to 140; pain was felt in the course of the vessels, and he died nine days after the accident.

Dissection.—In the right lung were several yellowish masses, which appeared chiefly formed of coagulable lymph, but when cut into were found to contain pus. The liver was large, and ecchymosed spots were observed upon its surface, but it was healthy in other respects. The femoral vein was filled with pus from the ham to the point where it is joined by the profunda vein, and its internal surface was covered with a thick layer of coagulable lymph.

In this case there was neither cough nor pain of chest, nor the slightest dyspnœa. The patient was particularly questioned on these points.

*Case XIII.*¹—On the 8th of May 1830, M.

¹ Danvin, Thèse citée, p. 17.

Blandin amputated the forearm of a man aged 76, on account of caries of the wrist of two and a half years' standing. Charpie was introduced between the lips of the wound, and the stump dressed. On the 14th there was considerable suppuration; some restlessness and a sense of chilliness; tongue dry in centre.

16th. Slight hæmorrhage from the wound; tongue dry; pulse small and frequent. On the 19th and 20th, there was a great and sudden change in the symptoms; features collapsed; restlessness; great prostration of strength; pulse very frequent; little or no discharge from the wound. The patient rapidly sunk, and died on the 24th.

Dissection.—In the liver were found purulent deposits, which projected chiefly from the convex surface in the form of yellowish prominences.

In this case it is particularly noticed that no phlebitis whatever existed in the veins of the stump.

Case XIV.—Another case is noticed by Danvin,¹ in which, after partial amputation of the foot, followed by extensive suppuration, shiverings came on, succeeded by heat of surface, dryness of tongue, frequency and smallness of the pulse, and symptoms similar to those already mentioned as occurring occasionally after amputations. In this case, how-

¹ Thèse, p. 28.

ever, no internal suppuration took place, but numerous abscesses formed in the leg, the thigh and the groin, which were successively opened, and after four months and a half a cure was effected. In this case there was also some appearance of inflammation of the saphena vein.

A case is given by Professor Syme, of amputation of the lower jaw, where death took place suddenly in consequence of the effusion of about two pounds of serous fluid into each cavity of the pleura.¹

V. PURULENT DEPOSITS AFTER INJURIES OF THE HEAD.

*Case XV.*²—A French gentleman, upwards of 30 years of age, was brought to St. George's Hospital on the evening of the 27th of July 1825, and admitted under the care of Mr. Keate. He was in a state of complete insensibility, in consequence of having fallen from his horse, and pitched on the side of his head. He died on the 18th of August, the twenty-third day after the accident.

On examining the body, it was found that a fracture had taken place, commencing a little above the posterior and inferior angle of the left parietal

¹ Edin. Med. and Surg. Journ. vol. xl. p. 328.

² London Medico-Chirurgical Transactions, vol. xiv. p. 276.

bone, and extending across the occiput to the foramen magnum. There was a considerable quantity of blood extravasated at the base of the skull. The brain itself was ruptured at the lower part of the posterior lobe of the left side, and pus had formed at that part between it and the pia mater. Both the liver and spleen were studded over their surface, and throughout their substance, with soft tubercular masses consisting of lymph mixed with pus, and with circumscribed abscesses of different sizes.

*Case XVI.*¹—A soldier was brought to hospital on account of a severe sabre cut, which had carried away part of the integuments of the head, with an oval portion, an inch and a half long, from the external table of the right parietal bone; the internal table remaining entire. For ten days, matters went on well, but on the eleventh, the suppuration diminished, and the lips of the wound became red and swollen. Fever came on, accompanied with headach, tinnitus aurium, delirium and thirst, and the patient complained of deep-seated pain and oppression in the right hypochondrium.—Leeches were applied to the wound; cupping to the temples and right hypochondrium; the head was covered with an emollient cataplasm; laxative medicine, enemata and antimonials were also exhibited.

¹ Larrey, Mémoires de Chirurgie Militaire, tome iv. p. 231.

The inflammation, nevertheless, continued to increase, and the pain of the side became very acute. The patient was seized with shiverings and cold sweats, followed by adynamic fever, and died thirty days after the receipt of the wound.

On dissection, the vessels of the pericranium were found remarkably injected. The portion of the dura mater corresponding to the wound, was red and swollen, and some serosity existed in the ventricles. In the abdomen there was a considerable quantity of pus, which had been obviously discharged from an enormous abscess in the convex side of the liver.

*Case XVII.*¹—A dragoon received a sabre cut, which, besides taking away a portion of the cranial integuments, had removed a considerable lamina from the right lateral part of the occipital bone; the internal table remaining entire. The wound was simply dressed, and for fifteen days did well, and was beginning to heal, when suddenly inflammatory symptoms appeared, with severe pain in the right hypochondrium, and great febrile excitement.—Local bleedings, cooling laxatives, &c. were prescribed without relief, and the patient sunk on the thirty-seventh day after the injury.

On dissection, twenty-four hours after death, there

¹ Larrey, *Mém. de Chir. Mil.* t. iv. p. 233.

was found violent inflammation of the pericranium, bone and dura mater ; a considerable abscess in the liver, with some purulent matter in the cavity of the abdomen.

In narrating these two cases, Baron Larrey states that neither of the individuals fell on the receipt of the injury.

*Case XVIII.*¹—A boy, 14 years of age, died of an affection of the brain, connected with fracture of the skull. He survived the injury about three weeks. Four days after the accident, a joint of one finger, and one ankle-joint, appeared swollen and painful ; the swelling extending some distance above and below the affected joints. There was no discoloration of the surface which might lead to the supposition that these parts had been bruised. The swellings suppurated, and were opened previously to the boy's death.

On dissection, Mr. Mayo found ulceration of the cartilages of the finger and ankle-joints.

*Case XIX.*²—A man, æt. 50, received a wound on the back part of the head from a stick. No bad symptoms followed, and he walked to hospital. He did well till the 14th day, when he was attacked

¹ Medico-chirurgical Trans. of Lond. vol. xi. p. 107.

² Morgagni de Sedibus Morborum, Epist. li. sect. 20.—tom. iii. p. 67, 4to. Ebroduni, 1779.

with rigors, succeeded by fever and pain of abdomen. Soon afterwards difficulty of breathing, with a sense of weight in the chest, cough and purulent expectoration came on, and he died about the twenty-second day.

On dissection, no lesion was found either in the bones of the cranium or the brain.—Both cavities of the thorax were full of pus, and tubercles and circumscribed abscesses were found in the lungs and liver.

Several cases are given by Mr. Arnott, in which there was distinct inflammation of the sinuses of the dura mater.¹

VI. PURULENT DEPOSITS AFTER WOUND OF FOOT AND SIMPLE FRACTURE OF FIBULA.

*Case XX.*²—George Stacey, 18 years of age, was admitted into St. George's Hospital on the 17th of July 1827, in consequence of an accident from a cart-wheel having passed over his left foot. There was a small wound under the little toe, made apparently by some sharp substance which had penetrated under the first phalanx, about an inch into the sole of the foot. Considerable ec-

¹ Lond. Medico-Chir. Trans. vol. xv. p. 92.

² Rose on depositions of pus and lymph, Lond. Medico-Chir. Trans. vol. xiv. p. 272.

chymosis had taken place over all the instep and foot, and there was a simple fracture of the left fibula about two inches above the ankle.—Leeches, cold lotions, and aperient medicines were ordered, and the limb was kept quiet and supported on a pillow.

On the 23d, he had shiverings after a restless night, and these were followed by diffuse cellular inflammation of the foot, which was relieved by incisions.

On the 5th of August, after having been reported convalescent, he was seized with a severe rigor, which lasted for more than an hour. On the 7th, the rigor returned, but the limb seemed to be doing well. On the 8th, he had frequent shiverings, succeeded by much heat, great frequency of pulse, and some sweating. On the 10th, it was observed that he had slight ptosis of the upper eyelid of the right eye ; pulse 150 ; tongue dry ; features collapsed, and skin having a yellowish tinge. Some degree of swelling was detected at the articulation of the right clavicle with the sternum.

On the evening of the 11th he died ; being the 26th day after the accident.

Inspection.—The pleuræ on both sides of the thorax were very vascular, and distended with a considerable quantity of a sero-purulent fluid, mixed

with loose flakes of lymph. The lungs on each side contained numerous small abscesses and soft tubercular masses, principally adjoining the surface of the pleuræ. These varied in size from that of a hazel-nut to less than a small pea, and in the middle of the small tubercles there was an irregular cavity filled with pus. One small abscess was found in the substance of the great lobe of the liver at some distance from its surface. There was some opacity of the arachnoid, and effusion into the articulation between the right clavicle and the sternum.

VII. PURULENT DEPOSITS AFTER EXCISION OF THE ELBOW-JOINT.

*Case XXI.*¹—John Malloch, æt. 30, entered the Surgical Hospital on the 23d of June 1830, on account of a diseased elbow-joint. On the 25th the excision of the joint was performed by Professor Syme. At first there was considerable constitutional irritation, with some difficulty of breathing, but on the 2d of July, he was able to be out of bed, and the wound looked well. On the 8th, however,

¹ Fifth Report of Edinburgh Surgical Hospital. Edin. Med. and Surg. Journal, vol. xxxiv. p. 221.

he had rigors, and on the 16th, a large abscess was opened on the hip. On the 19th, he had frequent shivering and sweating fits, with a weak rapid pulse, and a yellow tinge of the skin.—Wine and sulphate of quinine were ordered.

Rigors continued to return at intervals, and obscure fluctuation was felt in the groin. He now became very weak, and slightly delirious; pulse 160; breathing laborious; and he died on the 31st.

On dissection, the abscess of the hip was found to extend upwards among the muscles as high as the lumbar region. There was an extensive abscess between the ilium and iliacus internus, descending into the groin. There were old adhesions between the pleura pulmonalis and costalis on both sides, but especially on the right. Upon the centre of the anterior surface of the left lung lymph had been recently effused to a considerable extent, and about eight ounces of sero-purulent turbid fluid lay in the pleura of the same side. The lungs in several parts were indurated or hepatized; and in some places, suppuration had taken place so as to form deposits of the size of a walnut. Great part of the wound was healed.

VIII. PURULENT DEPOSITS AFTER LITHOTOMY.

*Case XXII.*¹—A healthy-looking man, 40 years of age, was cut for the stone, under which he had suffered for two years. He did well until the sixth day after the operation, when he was attacked with severe and repeated shiverings followed by fever, shrinking of the features, yellowness of conjunctivæ and skin, red, dry tongue, great depression of strength, temporary muttering delirium, oppressed breathing, and death on the fourteenth day after the operation.

Inspection.—The surfaces of the inferior lobes of the right and left lungs were covered with coagulable lymph, and there was purulent matter between the former and the diaphragm. Numerous depositions of pus had taken place into the substance of both lungs, not collected into distinct abscesses, but infiltrated. Collections of a similar description were found in both kidneys. Albuminous effusion was detected between the liver and diaphragm, and on the surface of the spleen. Small closely approximated phlegmons were found in the erectile tissue

¹ Ephemer. Méd. de Montpel. tom. i. p. 126. 1826. Quoted in Lond. Medico-Chirurg. Trans. vol. xv. p. 108.

of the penis, from the bulb of the urethra upwards as far as the commencement of the scrotum.

Another fatal case of lithotomy is noticed by Professor Syme, in which two or three pounds of serous fluid were found in the right cavity of the pleura.¹

Although I mean to confine my observations chiefly to purulent deposits, which take place after wounds and surgical operations, I cannot refrain from alluding to similar deposits occurring after delivery, more especially as from such cases arguments have been drawn in support of a particular theory to be afterwards noticed. With the view, therefore, of illustrating the subject more fully, I introduce the two following cases.

IX. PURULENT DEPOSITS AFTER DELIVERY.

*Case XXIII.*²—A woman, soon after a tedious and difficult labour, was seized with dull pains in the hypogastric region, accompanied with symptoms of continued fever, and abundant night sweats. She fell speedily into a state of great exhaustion, and a sudden collapse of features took place, succeeded by

¹ Edin. Med. and Surg. Journ. vol. xl. p. 331.

² Andral, Clinique Médicale, tome iv. p. 667.

delirium and severe diarrhœa ; and she died a few days after delivery.

Inspection.—The uterus was much softened, and around it were found several purulent collections, contained in sacs formed by coagulable lymph. There was some serosity in the cavity of the peritoneum. Several of the veins of the pelvis were filled with purulent matter, which seemed also to be mixed with the blood found in the common iliac vein, and the vena cava inferior. In the right lung there were three abscesses, each about the size of a nut ; the pulmonary texture around not being in the slightest degree changed. Another abscess existed in the liver, which was not altered in structure in any respect. A similar purulent collection was found in the brain, close to the thalami. This deposit was not surrounded by any appearance of inflammation, such as injection of the vessels, or softening of the cerebral substance.

*Case XXIV.*¹—A woman, aged 36, nine days after a natural delivery, in consequence of exposure to cold, was seized with shiverings, accompanied with pain and a sense of weight in the hypogastrium, and a diminution of the lochial dis-

¹ Dance, sur la Phlébite Uterine. Arch. Gen. de Méd. t. xviii. p. 501.

charge. The shiverings continued to recur for several days ; fever and diarrhœa came on ; and she entered the Hotel Dieu, at Paris, on the 14th of February 1828, three weeks after delivery, with the following symptoms :—Great alteration of the features ; an expression of anxiety and distress ; answers slow and incoherent ; painful distension of the hypogastrium, where a rounded tumour is felt ; a copious fetid discharge per vaginam ; considerable diarrhœa ; tongue moist ; pulse frequent and soft ; some painful swelling of left middle finger.—Cataplasms were applied to the hypogastrium and middle finger, an emollient enema was administered, and next day twenty leeches were applied to the lower part of the abdomen.

16th. Violent delirium during the night ; abdomen generally painful on pressure ; pulse hard and wiry ; short dry cough ; chest is resonant on percussion ; some mucous râle ; fluctuation perceptible in first joint of middle finger.—Forty leeches were applied to the hypogastrium, and a semicupium ordered.

17th. Low delirium ; subsultus tendinum ; complete facies hippocratica ; coldness of the extremities ; pulse small, scarcely perceptible. Breathing became laborious, and she died on the morning of the 18th.

Inspection.—In the left cavity of the chest there was considerable sero-purulent effusion, with some flakes of lymph. Both lungs were studded, more especially near the surface, with numerous isolated purulent deposits, some of which seemed about to discharge their contents into the cavity of the pleura. The lower lobes contained a much greater number of these deposits than the upper. The pulmonary tissue between the abscesses was quite sound. In the abdomen there were distinct marks of peritonitis, and an abundant sero-purulent effusion. The spleen was soft, and contained three distinct purulent deposits. The uterus was softened. Large veins, filled with pus, traversed its parietes in all directions. The veins of the round ligament also were filled with purulent matter.

REVIEW

OF THE

PRINCIPAL FACTS OF THE CASES.

IN reviewing these cases, and numerous others, which are mentioned by authors, we find that purulent deposits take place after wounds of the veins, as in venesection ; after division and ligature of veins ; after fractures, more especially compound and comminuted fractures ; after amputations and excisions of joints ; after various wounds, particularly wounds of the head ; after delivery ; and after almost all surgical operations, even the least important, as the operation for the cure of hydrocele, fistula in ano, and hæmorrhoids.

The situations in which they are liable to occur are the lungs, liver, spleen, brain, joints, serous cavities, heart, kidneys, muscles and cellular tissue.

The symptoms attendant on the formation of these deposits appear, for the most part, a few days after the infliction of some injury, and indicate considerable constitutional disturbance. They generally come on very suddenly without any apparent cause, sometimes at the very time that the patients seem to be doing well. The following are the usual symptoms :—Rigors, long-continued and recurring at intervals, succeeded by febrile symptoms more or less marked ; anxiety and restlessness ; great collapse of features and depression of spirits ; prostration of strength and an unaccountable feeling of oppression ; occasional sickness and vomiting ; pains referred to different regions, as the chest, abdomen and joints ; pulse weak, rapid, occasionally 150 or 160, easily compressed ; tongue brown and dry, sometimes the papillæ peculiarly red and prominent ; lips and teeth incrustated ; abdomen tympanitic ; diarrhœa and sweating ; difficult breathing and a short dry cough ; features become pinched and extremities cold ; conjunctivæ and skin of the whole body assume a yellow colour ; delirium, subsultus and petechiæ supervene, and the patient dies with all the appearance of one in the last stage of typhus. The wound during all this time shows no tendency to heal ; the lips of it are pale and discoloured ; suppuration, from being

copious is diminished and often entirely suppressed;¹ the discharge from being thick and yellow frequently becoming, before its suppression, thin and watery, and exhaling a very fetid odour; the soft parts become flaccid, and the muscles and bones separate from each other.

Such is a general account of the symptoms; but they vary, of course, in individual cases according to the situations in which the purulent deposits take place. In some cases there is well-marked inflammatory fever in the first instance, while in others typhoid symptoms come on rapidly with scarcely any previous excitement, as in Cases X and XI.

Rigors are almost invariably the first indication of the change that is taking place. The peculiar sallow or even yellow appearance which the skin exhibits, is also a symptom which is noticed in almost every case to a greater or less degree.² In regard to this symptom in Brockie's case, (p. 21.) Sir George Ballingall remarks; "one symptom appeared early in this case, which, as far as my observation goes, is a circumstance almost uniformly foreboding a fatal termination; I allude to a peculiar yellow hue of the skin, which not unfrequently

¹ See Cases VII, VIII, IX, XIII, XVI.

² See Cases III, VIII, IX, XII, XX, XXI, XXII.

attends the symptomatic fever supervening upon wounds and operations.”¹ This tinge is sometimes very deep, as in a case mentioned by Professor Syme, in which, after amputation of the leg, shivering and febrile symptoms came on, and the patient died on the eighth day, with all the appearance of a person labouring under the most confirmed jaundice.²

The astonishing rapidity with which purulent deposits are formed, and with which they proceed to a fatal termination, must have attracted attention in all the cases which have been detailed.

In some cases, (I, II, III, IV,) we have seen that there was distinct phlebitis, and after death the ordinary signs of inflammation found in the veins; in others, (VII, XIII,) after a careful examination both during life and after death, no symptom of phlebitis could be detected; while in other cases again, (V, VI,) phlebitis existed in the first instance, but left no traces to be detected after death. In some instances³ we have pain, redness, swelling and other marks of inflammatory action; in others, especially where internal organs are affected, no indications whatever are given by the symptoms of

¹ Sir George Ballingall's Clinical Lecture, July 1828, p. 12.

² Edin. Med. and Surg. Journal, vol. xxxiii. p. 250.

³ See Cases I, II, III, V, VI, XVI, XVII, and XIX.

the peculiar change which is taking place, as in Cases VII, XII, XX.

The deposits themselves are at one time accompanied with distinct signs of inflammation in the surrounding tissue;¹ at other times no marks of inflammatory action can be discovered.² This is often remarkably exhibited in the joints. Thus in Case I, we have pus in an articular cavity, and scarcely any disease of the synovial membrane or cartilages, so that when the pus is washed off, the joint appears nearly quite healthy; in Case III, on the other hand, there is distinct vascularity and ulceration of the cartilages; while in Case V, we find slight inflammation in one joint, and no trace of it in others, although purulent matter existed in all.

The character of the abscesses varies in some degree, according to the organ affected:—

In the lungs they are usually formed, first at the base, and proceed towards the summit, so that we meet with them in greatest number and most developed in the lower lobes.³ This is a circumstance on which Dance insists, as distinguishing these purulent deposits from the suppuration de-

¹ See Cases III, IV, VI, VIII, X.

² See Cases VII, XXIII, and XXIV.

³ See Case XXIV.

pending on the presence of scrofulous tubercles. Both lungs are liable to these depositions, but Dance says that the right lung is oftener affected than the left.¹

Sometimes we meet only with a few large abscesses in the lung, at other times we have numerous small collections of matter scarcely larger than a pea. (Case VII.) They generally occupy the surface of the organ, and, when the thorax is opened, appear in the form of yellowish prominences on the pleura. Sometimes they perforate this membrane, and pour their contents into the cavity of the thorax, giving rise to pleurisy. In some instances there is first a sanguineous infiltration or congestion of the lung, succeeded by the formation of a hard, blackish, and afterwards whitish tubercle, which begins to soften in the centre, and is ultimately converted into a true abscess ; so that in the same lung we meet with abscesses fully formed, portions of the lung condensed, and tubercles, some in a crude hardened state, and others containing in the centre a small quantity of pus.² In other cases, no such process can be traced, and pus seems to have been formed without any previous tubercular deposit.³ Pus,

¹ Archives Générales de Médecine, tome xix. p. 167.

² See Cases IX, XI, XII, XIX, XX, XXIV.

³ See Cases IV, VII, XXI.

too, is sometimes infiltrated into the parenchyma of the lungs.¹

The liver, next to the lungs, seems to be the organ which is the most frequent seat of purulent depositions after injuries. Molinelli says that they are generally formed near the surface of this viscus, while Bertrandi considers them as usually deep-seated.² They seem to be found in both situations, but chiefly near the convex surface,³ and they generally attain a large size, from the apparent facility with which the liver yields to the suppurating process. Louis says that they are sometimes surrounded by a false membrane, so as to become encysted, and on the breaking down of this membrane, they become enlarged, and exhibit the appearance of loose flocculent masses, floating in pus.⁴ The same process appears to take place in the liver that we have already noticed in the case of the lungs, portions of the organ being indurated, and others being studded with tubercles, in a hardened and softened state.⁵ The parenchyma of the liver surrounding

¹ See Cases VIII, and XXII.

² Mém. de l'Acad. Roy. de Chirurgie, tome iii. p. 492.

³ See Cases XIII, and XVI.

⁴ Mémoire sur les Abscesses du foie, par M. Louis. Repertoire d'Anatomie, t. i. p. 129.

⁵ See Case XIX.

the abscesses is at times softened and inflamed, and, on the other hand, frequently no change whatever in its texture can be detected.¹ The matter found in abscesses of the liver has sometimes a greenish hue, and is occasionally discharged into the cavity of the abdomen.²

Purulent deposits, as we have shown, are also found in the spleen,³ the brain,⁴ and the heart,⁵ accompanied with more or less disorganization.

In the kidneys,⁶ they occupy the cortical more frequently than the tubular portion, and in intemperate habits they are associated with that peculiar degeneration which has been noticed by Drs. Bright, Christison and Gregory.

The effusions which take place into the serous cavities, as the pleura, peritoneum, pericardium, and arachnoid, differ little from the usual products of inflammation in these membranes, consisting of sero-purulent fluid and flocculi.⁷

¹ See Case XXIII.

² See Case XVI.

³ See Cases VII, and XV.

⁴ See Cases VII, and XXIII.

⁵ See Case VII, and *Medico-Chirurg. Trans.* vol. xv. p. 128.

⁶ See Cases VII, and XXII.

⁷ See Cases VIII, and XX.—Velpeau however affirms: Dans les cavités sereuses on trouve une couche de veritable pus plus

When these abscesses form in the joints, they are usually preceded by pain, redness, and swelling, and the matter is often infiltrated into the surrounding tissues.

The purulent deposits found in the veins are generally the consequence of phlebitis. Pus is sometimes deposited in the coagulable lymph, which is found obliterating their cavities.

We have seen that purulent deposits take place after delivery. Dance says, that they generally take place in the joints. They are preceded by inflammation of the veins and absorbents of the uterus, as has been noticed by Chaussier, Schwilgué, Clarke, Wilson, Tonellé, Duplay, Dumas, and Lee.¹ The phlebitis has, in several instances, been distinctly referred to the orifice of the veins where the placenta adhered.

Cases are also given by Dr. Hall and Mr. Higginbottom, in which destructive inflammation of the eye and suppuration of the integuments, as

ou moins épais, le reste du liquide d'une teinte cendrée ou terreuse est fort loin de ressembler aux flocons et à la sérosité lactescente des pleurésies ou peritonites franches. *Elements de Méd. Opératoire*, Introd. p. 43.

¹ See Clarke's *Practical Essays on the management of Pregnancy*, p. 70. Lond. 1773.—Wilson, *Trans. of Soc. for improve-*

well as of the joints, occurred in the puerperal state.¹

Purulent deposits occur after operations in various other parts of the body. The thyroid gland,² and even the erectile tissue of the penis,³ have become the seats of these deposits.

All the cases which have been detailed concur in proving, that the deposition of purulent matter after injuries is almost invariably accompanied with fatal results. A successful case is noticed at page 27, where the purulent deposits took place externally, and were successively opened. The cure was very tedious.⁴

ment of Med. and Chirurg. Knowledge, vol. iii. p. 65.—Dr. Lee's Memoirs in Lond. Medico-Chirurg. Trans. vol. xv. p. 369. and vol. xvi. p. 377.—Dumas, Mag. Jour. de Phys. t. x. p. 99.—Essai sur la Metrite gangreneuse, par Dr. Danyau. Paris, 1829.

¹ Medico-Chirurg. Trans. of London, vol. xiii. p. 189, and vol. xv. p. 118.—Lawrence on Diseases of the Eye, p. 651. 1833.

² Hennen's Milit. Surgery. 3d edit. p. 273.

³ See Case XXII.

⁴ See also cases by Mr. Mayo. Lond. Medico-Chirurg. Trans. vol. xiii. p. 104.

OPINIONS
OF VARIOUS AUTHORS
ON
THE SUBJECT.

THE formation of abscesses in distant situations after wounds, engaged the attention of surgeons in early times, and in the writings of Paré, Pigras, Bonnet, Morgagni, and others, we find various hypothetical doctrines advanced. It is only, however, in comparatively recent times, that due attention has been bestowed upon a subject of such interest and importance.

As the early theories were framed with the view of accounting for the connexion between wounds of the head and abscesses of the liver, I shall, in the first place, advert to this part of the subject.

Paré¹ seems to have attributed these abscesses to

¹ Paré, liv. xvii. chap. 51.

absorption of pus from the wound in the head, an opinion which was also adopted by Pigrai, Bonnet,¹ and others.

Marchetti supposed, that purulent deposits in the liver were owing to the mere descent of pus from the head towards that organ. This supposition, however, received few supporters, and was opposed by Morgagni.

A more complicated theory was advanced by Bertrandi² and Andouillé,³ who maintained, that in the concussion which accompanies wounds of the head, there is an increased quantity of blood sent to the brain, and consequently more than usual brought to the right auricle by the vena cava superior; that thus an obstacle is presented to the passage of the blood from the inferior cava, which gives rise to congestion in the liver, and the subsequent formation of abscesses. In opposition to this, Pouteau and David asserted, that instead of a greater determination to the head, there was actually an obstruction to the transmission of the blood

¹ Theoph. Boneti Sepulchretum, tom. ii. lib. iv. sect. 3. obs. 5. p. 322. folio, Lugduni, 1700.

² Mémoires de l'Académie Royale de Chirurgie, tome iii. p. 484.

³ Andouillé, sur les abcès du foie, Mém. de l'Acad. de Chirurg. t. iii. p. 506.

to that organ, and that this gave rise to hepatic congestion and suppuration.¹

Desault thought that there was a more intimate connexion between the liver and the brain than between any other organs, and that an injury of the one was usually followed by an affection of the other.² In speaking of the erysipelas attendant on wounds of the scalp, he observes, “*qu’il est rare que les symptomes deviennent violens sans que le foie ne s’affecte, ou même qu’un dépôt ne s’y forme.*” The formation of these abscesses was by him therefore attributed to the sympathy established through the medium of the nervous system between the brain and the liver.

Richerand³ sets aside all these explanations, and considers abscesses of the liver as the result of some injury received by that organ itself at the time when the wound of the head was inflicted. He endea-

¹ The views of all these authors are combated by M. Louis in a memoir on abscesses of the liver in the *Repertoire d’Anatomie*, tome i.

² Klein, a German surgeon, says, that the liver oftener sympathizes with wounds of the shoulder than with wounds of the head. I am not aware whether he attributes this to nervous connexion, as the pain of the shoulder in cases of hepatitis.

³ *Nosographie et Therapeutique chirurgicales*, tome iii. p. 68. Paris, 1821.

vours to show that from the size, weight, position, and texture of this viscus, it is more exposed to injury than any of the other viscera. He produces cases of wounds of the head followed by abscesses of the liver, in which he could distinctly show that the liver was wounded in the fall, and he also brings forward others in which no abscess was found, and in which he ascertained that no injury whatever was inflicted on the liver; and he concludes by saying, “ les plaies de tête produites par la percussion directe et immédiate du crane, dans lesquelles la commotion est bornée au cerveau, et ne s’étend point aux autres viscères, ne sont pas compliquées d’abcès au foie; preuve évidente que c’est à l’ébranlement simultané du foie et du cerveau, qu’il faut attribuer la connexion qui existe entre leurs maladies.”¹ He appeals also to the works of Paré, Petit, Pott, and Desault for a confirmation of his statement.

In order, however, to put the matter, as he conceives, beyond doubt, he precipitated forty dead bodies from the height of eighteen feet into the dead-room in the hospital of Saint Louis, and states, that in every case, there was more or less lesion both of the brain and the liver.

From such experiments as these, no correct con-

¹ Ouvrage cité, p. 71.

clusions can be drawn as to the effect of falls in the living subject.¹

The partial view which Richerand took of the subject led him to suppose that his conclusions were quite satisfactory, and he expresses his surprise that so simple an explanation had not suggested itself to others. Unfortunately, however, for his theory, cases have occurred in which abscesses of the liver were found after wounds of the head, on the receipt of which the individuals did not fall, and did not receive any injury in the hypochondriac region. Cases of this kind are mentioned by Baron Larrey, and two of them have been detailed at pp. 29 and 30, (Cases XVI and XVII.)

If there was any truth in Richerand's theory, then we should not so often meet with abscesses of the liver in military practice, where wounds of the head are not inflicted by a fall from a height. Yet Pigrai, one of the older army surgeons, mentions that one year, almost all the wounds of the head occurring in battle were followed by abscesses of the liver. Briot too, mentions, that in the hospital of

¹ It would, however, appear that even in the living subject, the liver is very apt to be injured by a fall. Sir George Ballingall tells me that he has seen seven cases of ruptured liver from this cause, several of them occurring in the persons of soldiers who had fallen or thrown themselves from the walls of fortresses.

Strasbourg, out of seven cases of soldiers who died from sabre and gunshot wounds of the head in January and February 1794, six had abscesses in the liver.¹

Briot does not attempt to give any explanation of the formation of these abscesses.

Larrey attributes them partly to metastasis, and partly to sympathetic irritation of the liver from the inflammation of the fibrous membrane of the brain, and he thinks that this irritation rarely crosses the median line.²

All these theories were applied exclusively to the connexion between wounds of the head and abscesses of the liver, and they all, more especially those of Desault and Richerand, proceeded on the supposition that after such wounds purulent deposits were not found in any other organ. This connexion is now found not to be so invariable as Desault supposed, and numerous instances are recorded where injuries of the head were followed by abscesses in the lungs, pleuræ, spleen, joints, &c.

Morgagni early noticed this; and in Case XIX, which is quoted from his works, we find pus in the thorax, and tubercles and abscesses both in the liver

¹ Briot, *Histoire de la Chirurgie Militaire*, p. 113. Besançon, 1817.

² Larrey, *Mémoires de Chirurgie Militaire*, t. iv. p. 237.

and lungs. In another case of death from injury of the head, he states, that on inspection "*pulmones inventi sunt parvis abscessibus multis ac variis excavati.*"¹

Conceiving, then, that the purulent deposits met with in the liver after wounds of the head, are referable to the same cause as those found in other organs after wounds in various parts of the body, we shall now proceed to give a short view of the theories which have been brought forward to account for the formation of abscesses after injuries, in whatever situation these may be found.

Monteggia, Petit and Van Swieten, attributed these abscesses to the absorption and subsequent passive deposition of pus. The latter author says, "*pus autem in loco cavo corporis collectum venosis osculis resorberi et sanguini misceri posse, atque postea ad varia corporis loca deponi, docent observata plurima.*"² And he adds, at a subsequent part of the same section, "*ab hac puris resorptione toties pereunt illi, quibus extirpatis membris, aut aneurysmate exsecto, ingens vulnus factum fuit, quod quotidie magnam puris copiam dat.*"

¹ Morgagni de Sedibus Morborum, lib. iv. epist. 51, sect. 19.

² Gerard. Van Swieten, Commentaria in Boerhaave Aphorismos, tom. i. sect. 406, p. 706. Hilburg. et Meiningæ, 1747.

While Morgagni supposed that in many instances there was an absorption and deposition of pus, he also conceived that, in other cases, the purulent matter was increased by a sort of inflammatory process. Thus he says, “ videtur secundum eas observationes pus in viscera aliunde invectum, non puris forma semper deponi, sed haud raro saltem nonnullas ejus particulas cum sanguine permistas, et prorsus disjunctas, in angustiis quibusdam, fortasse glandularum lymphaticarum hæerere, easque, ut in venereorum bubonum productione fit, obstruendo, aut irritando, eoque humores præterituros retinendo, distendere, et multo copiosioris quam quod advectum est puris generationi, a rigoribus et horroribus significatæ, causam præbere.”¹

Quesnay also allowed the absorption of pus, and thought that, by its presence in the blood, it excited inflammation in the different situations in which it was deposited.²

Hunter declared the translation of purulent matter to be absolutely impossible ; and he denied that the absorption of this fluid was attended with those pernicious effects which had been generally attributed to it.³ Mr. Arnott thinks that it is owing

¹ Morgagni de Sed. et Causis Morb. lib. iv. epist. li. sect. 23.

² Quesnay, Traité de la Suppuration, p. 344. Paris, 1749.

³ Hunter on the Blood, pp. 360, 501. 4to. Lond. 1794.

to the influence of these opinions of Hunter, that the affections of the viscera, which had been formerly attributed to metastasis, ceased for a time to interest or attract the notice of British surgeons.¹

Mr. Guthrie, in his work on gunshot wounds, in speaking of secondary amputation, alludes to abscesses of the lungs as a frequent sequel of such an operation ; and he attributes them to an alteration in the sanguiferous system, which induces irritation in some particular part, generally that most predisposed to disease ; and hence, he says, in Great Britain the lungs are most frequently affected.²

Some surgeons have supposed that purulent deposits, in almost all cases, arise from the softening of latent tubercles, which are called into activity by the irritation consequent on an operation.

Sir Charles Bell, on the other hand, observes that independently of any predisposition to disease, the irritation of a severe wound is sufficient to give rise to purulent deposits in the lungs.³

Dr. Hennen alludes to abscesses occurring in the lungs, liver, abdomen and joints, after amputation, as cases of metastasis ; and he appears, in

¹ Medico-Chirurg. Trans. vol. xv. p. 63.

² Guthrie on Gunshot Wounds, p. 255. Lond. 1820.

³ Bell's Surgical Observations, vol. i. p. 241. 1817.

some instances, to attribute the fatal result to inflammation of the veins extending to the heart. He remarks, “in some cases of amputation the veins, in others the arteries, and in others, again, both the veins and arteries will be found inflamed, from the point of the stump to the very auricle and ventricle ; and in many parts lined with coagulable lymph, or filled with purulent matter, to various distances. In the dissections conducted by Messrs. Dobson, Bingham and Crofton, after the battle of Waterloo, we met with no less than twelve cases where the veins were inflamed, and where, at the same time, purulent matter was found in the arteries, with a considerable thickening of their coats.”¹

Mr. Rose, who in his valuable paper in the *Medico-Chirurgical Transactions of London*,² brought this subject distinctly under the notice of British surgeons, is disposed to look upon nervous irritation and sympathy as the cause of purulent deposits after injuries. He says that there is a great difference between these deposits and the abscesses produced by ordinary inflammation,—a difference which is owing to the rapidity with which they are formed, as well as the constitution of the patients.

¹ Hennen's *Military Surgery*, p. 271, 3d edit.

² Vol. xiv.

The French surgeons have devoted considerable attention to the subject. Velpeau has published several valuable treatises upon it.¹ He considers these collections of matter as depending on the entrance of pus into the circulation, and its subsequent deposition. Rochoux,² Maréchal,³ Reynaud⁴ and Legallois,⁵ have adopted his views. According to them, pus and other morbid matters from wounded and inflamed surfaces, at times enter the circulation either by lymphatic absorption, by imbibition, or by the orifices of the veins themselves; the discharge from the wound is thus diminished or altogether suspended, and the pus, after passing through the blood-vessels and heart, is simply deposited in various situations, in the manner described by Velpeau in the following passage :—“ Le pus, mêlé au sang, est une matière hétérogène, qui tend continuellement à s’en séparer, à se porter au dehors par un

¹ Thèse sur quelques Propositions de Médecine. Paris, 1823.—Archives Générales de Médecine, tom. vi. et xiv.—Revue Médicale, tome ii. iii. et iv. 1826.—Elements de Médecine Opératoire, tom. i. Introduct. p. 39.

² Rochoux, Thèse.

³ Maréchal (J. F. A.) Recherches sur certaines alterations qui se développent au sein des principaux viscères à la suite des blessures ou des opérations. Thèse, Paris 1828.

⁴ Reynaud de Marseille, Thèse, 1828.

⁵ Legallois, Journal Hebdom. tom. ii. et iii.

voie quelconque. Tant qu'il est renfermé dans les gros vaisseaux, et que la circulation n'a rien perdu de son activité, il ne peut s'épancher nulle part; mais, dans le système capillaire, où le mouvement des liquides n'est plus qu'une sorte d'oscillation, où s'opèrent les nutritious, les diverses sécrétions, mille combinaisons nouvelles, tant de compositions, de décompositions, ses éléments ne doivent-ils pas faire effort pour s'agglomérer, se réunir, et cesser de marcher avec les autres fluides? Cette aggrégation toute chimique une fois commencée, ne va-t-elle pas constituer un centre d'attraction pour les molécules analogues? En faut-il davantage pour déterminer le noyau d'un abcès?"¹ Velpeau also allows that in some cases, inflammation may be present in the veins, and that the pus thus formed may be absorbed into the circulation.

Cruveilhier,² Dance,³ Arnott⁴ and Blandin,⁵ are

¹ Velpeau, *Elements de Méd. Op.* tom. i. *Introd.* p. 50.

² Cruveilhier, *Anatom. patholog. du corps humain*, 11^{me}. fasc. *Phlebite.* 1830.

³ Dance, *Arch. Gén. de Méd.* tom. xviii et xix.—Thèse Inaugurale sur la phlebite.—*Dict. des Sciences Med.* 2^{de} Edit. Article. *Abcès metastatiques*, tome i.

⁴ Arnott on secondary inflammation of the veins. *Lond. Medico-Chir. Trans.* vol. xv.

⁵ Blandin, (Phil. Fred.) *Recherches sur quelques points d'Anatomie de Physiologie et de Pathologie.* Thèse, Paris, 1824.—

opposed to Velpeau's views. While they agree with him in thinking, that in cases of purulent deposition, pus or some morbid matter is mixed with the circulating fluid, they differ from him in maintaining that this pus is always the product of phlebitis. They endeavour to prove that in such cases there is no absorption of pus from a suppurating surface, but that some of the veins are inflamed and secrete purulent matter, which is at once mingled with the blood and carried into the circulation. They have certainly shown that in cases of phlebitis from venesection and from ligature of veins, as well as in cases of uterine phlebitis after delivery, abscesses are found in different parts of the body, attended with the same symptoms as those occurring after amputation or fracture, and having established this, they endeavour to demonstrate that in cases of purulent deposits after wounds of every kind, some degree of inflammation can be detected in the veins by careful examination; the veins inflamed being, not those which are nearest the situations in which the abscesses are found, but generally very distant; and the symptoms bearing no proportion to the extent of the vein inflamed.¹

Mémoire sur quelques accidens très communs à la suite des amputations des membres. Journal Hebdom. tom. ii. p. 579 et seq.

¹ Mr. Hunter states that the larger the veins inflamed, the

According to Arnott, the inflammation rarely reaches the heart,¹ but is generally limited by the passage of a current of blood ; where a trunk is concerned, the boundary being the entrance of a branch, and where a branch is concerned, the boundary being the junction of this with the trunk.²

On dissection, Dance and his supporters found pus, lymph, or some sign of inflammation in the veins.

Not only do these authors differ from Velpeau in declaring that there is no absorption of pus in the cases now under consideration, but they also differ from him in the explanation which they give of the manner in which the deposits themselves are formed.

more likely is pus to be carried rapidly into the circulation, because there is less chance of deposition of lymph which prevents the transportation of pus in the smaller veins.—Trans. of Soc. for improvement of Med. and Surg. Knowledge, vol. i.—Abernethy's Surgical Works, vol. ii. p. 149.

Mr. Travers says that the most fatal cases of phlebitis are those in which no pus is formed, but where adhesive matter or lymph is deposited.—Cooper's and Travers' Surgical Essays, 3d edit. vol. i. p. 286.

¹ In some cases given by Ribes, Hodgson and Hennen, the inflammation seemed to have reached the lining membrane of the heart.—Revue Med. July 1825.—Hodgson on Dis. of Arteries, p. 511.—Hennen, Mil. Surg. p. 271.

² Lond. Medico-Chir. Trans. vol. xv. p. 46.

In place of viewing them as caused by a simple transportation and deposition of pus, they say that the pus mixed with the blood poisons the system and induces irritation in the minute veins of the lungs, liver, &c., leading to inflammation and the formation of purulent matter. Arnott does not seem to be perfectly satisfied as to the exciting cause of the inflammation which, however, he believes to exist.

In cases of wounds of the head giving rise to abscesses in various organs, they bring forward instances where the veins of the diploe or of the integuments of the cranium, or the sinuses of the dura mater were inflamed and filled with pus.

In order to prove their hypothesis, they also adduce cases where abscesses formed suddenly in the liver, &c., without any external wound, and where on dissection, inflammation of the sinuses, of the vena portæ or some part of the venous system was detected;¹ and from all the observations which they have made, they draw the conclusion, that in every case of purulent deposition after injuries, phlebitis is present to a greater or less extent, and that upon this depend all the symptoms.

¹ Arnott, *Medico-Chir. Trans.* vol. xv. p. 98, note, and page 109.—Abercrombie on *Dis. of the Brain*, p. 39.—*Arch. Gén. de Méd.* tome xix. p. 40.

Velpeau, in supporting his theory, states that, although phlebitis may be present in some cases, it cannot be detected in all, and that he has frequently found purulent deposits in cases where, after careful and minute examination, no inflammation could be discovered in the veins, and no alteration whatever in the tissues surrounding the abscesses. He mentions particularly that he demonstrated this in the hospitals of Saint Antoine and La Pitié, to MM. Dezeimeris and Bérard, both of whom were supporters of Dance's theory.¹

Andral would seem to concur with Velpeau in his opinions. Thus, in speaking of Case XXIII, he says, "ne semble-t-il pas que le pus, primitivement formé dans l'excavation du bassin, a été absorbé, porté dans les veines où on l'a trouvé, intimement mêlé dans le cœur au reste du sang où il n'a plus été possible de l'apercevoir, puis déposé dans le parenchyme des poumons, du foie et du cerveau."²

Dr. Copland³ says that it seems extremely probable, that owing to depressed vital energy and deficient resistance of the frame, purulent matter passes into and vitiates the blood ; that the morbid con-

¹ Velpeau, Elem. de Méd. Op. Introd. p. 49.

² Clinique Médicale, t. iv. p. 667.—Archives Gén. t. xviii. p. 524.

³ Diet. of Pract. Med. Art. Abscess, p. 16.

dition of the circulating fluid thus induced, depresses still lower the already weakened nervous powers, and that the irritating matters carried into the circulating current change the state of the capillaries of parenchymatous and some other organs, so that they secrete purulent matter without any evident sign of previous or accompanying inflammation.

GENERAL CONCLUSIONS.

I HAVE thus detailed all the information which I have been able to collect on this interesting subject, and I shall now take a general review of the principal facts and opinions which have been noticed.

After almost all wounds and surgical operations, there is more or less irritation accompanied with symptomatic fever, which, when suppuration is established, and the wound does not heal by the first intention, is very apt to assume the typhoid type. In consequence of this irritation, inflammatory action is frequently excited in some part of the system.¹ While we know this to be a fact which is

¹ Dupuytren remarks, that of those who died at the Hôtel-Dieu after operations, the majority perished in consequence of inflammation of an internal organ ; sometimes two, three, or even four organs, being thus affected in the same individual.

indisputable, we are unable, I fear, to give an explanation of it. Every surgeon is aware that a weak part, predisposed to disease, is in such circumstances very liable to be affected. He knows, for instance, that in an individual of a scrofulous diathesis, predisposed to phthisical complaints, the irritation of an important operation may lead to the development of tubercles previously in a latent state, while in intemperate habits the same cause may give rise to disease in the liver or kidney. In some constitutions of peculiar irritability, even although there is no proneness to disease, any operation, however trivial, may give rise to alarming consequences. Thus, Professor Syme mentions a case where the ordinary injection for hydrocele produced violent irritation, with sloughing of part of the scrotum ;¹ and a case is given in the *Dictionnaire des Sciences Medicales*, where an emotion of the mind was the immediate cause of death : A man was cut for stone, who had a presentiment that he would die from the operation. He did not suffer much at the time, but the occurrence of slight hæmorrhage soon afterwards threw him into the most violent agitation. The hæmorrhage was easily

¹ Third Report of Surgical Hospital. Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 245.

suppressed, but the patient could not be calmed, and sunk rapidly with all the appearance of a jaundiced person.

Now in all the cases to which I have alluded in this essay, there was a wound which did not heal by the first intention giving rise to constitutional irritation, occasionally of a very violent nature, as indicated by severe rigors and the other symptoms which I have already enumerated. Hence we might naturally expect that inflammation would be excited in some part, more particularly if weakened by previous disease. In some of the cases there was a distinct predisposition to disease. Thus, in Case XI, the patient had been labouring under disease of various organs, and amputation was performed at the man's urgent request, and contrary to the surgeon's own wish. In this case it will be seen that alarming symptoms came on immediately, and proved rapidly fatal. In other cases there was a peculiar irritability of constitution which was only detected after the operation. This is well shown in Case XXI, where the elbow-joint was excised; an operation which I have seen performed six or eight times without producing irritation to any great degree, the patients generally being with difficulty confined to bed. In the case, however, just alluded to, from having seen what took place, I agree with Mr. Syme that

any operation would in all probability have been attended with fatal results.

The irritation consequent on an operation may be said either to be of a direct or indirect nature. Thus, amputation of a leg, immediately after an accident, in a person previously in good health, gives rise to direct irritation, which, according to Mr. Syme, generally ends in inflammation or suppuration of the stump itself; while the same operation, in the case of a person who has had for many years a profuse discharge from the ankle-joint, causes indirect irritation by suddenly stopping this discharge, to which the system had become habituated. The direct irritation in such a case is not so great as the indirect, and Mr. Syme thinks that it is apt to end in inflammation or suppuration of some other part, as, for instance, the lungs, liver, serous cavities or joints. If there is any weak part, the effusion will, in all probability, take place there.¹ In some cases

¹ Sometimes death speedily follows an operation, from the sudden removal of a powerful source of irritation, without any deposit of pus. Thus, in the case of a man who, for nearly three years, had suffered all the symptoms of stone in a degree of extraordinary severity, and had been forced to make use of laudanum to a great extent, the operation of lithotomy proved rapidly fatal without any deposition; and in speaking of this case, Mr. Syme remarks, "that the fatal result may be ascribed to the effect of suddenly removing a source of extreme irrita-

a profuse perspiration¹ or diarrhœa will carry off all the febrile symptoms, and by the relief thus given to the system fatal consequences will be prevented.

Mr. Guthrie remarks, that those persons were most commonly affected with purulent deposits who, previously to amputation, had laboured under considerable pain or an excessive discharge; whilst those who suffered amputation without enduring such previous state of disease generally escaped; just as the stoppage of a hæmorrhoidal discharge of long standing, or the cure of old fistulæ by the knife, is apt to induce apoplexy or disease of the lungs. Hence, he says, purulent deposits rarely succeed amputations on the field of battle, because the persons are generally in good health; while those reduced by disease, and accustomed to a profuse discharge, are rendered highly irritable by the continuance of both, and predisposed to irritative fever

tion in a very irritable system. In ordinary cases of stone, this diminution of irritation contributes to the patient's safety by counterbalancing the irritating tendency of the operation. But the irritation in this instance being of extraordinary intensity, while the operation, from the small size of the stone, was easily and gently performed, it is conceivable that the action of the system might, from the cause alleged, fall into disorder, and produce the fatal consequences." Sixth Report, p. 16.

¹ A case of this kind occurred lately in the Surgical Wards of the Infirmary. Edin. Med. and Surg. Journ. vol. xl. p. 334.

on the application of an exciting cause, and this fever is followed by inflammation in some part.¹

In many of the cases which I have related, it will be seen that the patients had been reduced by disease, or had suffered long from a profuse discharge, or from irritation of some sort, so that they were in circumstances the most favourable for the development of abscesses.

Most of the authors who have written on the subject of purulent deposits, have agreed in supposing that the presence of pus in the circulation is to be looked upon as the cause of many of the phenomena.² In some cases, indeed, the existence of purulent matter in the blood-vessels has been distinctly proved; and if we are to trust the microscopic observations of Gendrin³ and Kaltenbrunner,⁴ it is often found in the blood in cases of inflammation. In some of these it is carried off by different emunctories, while in others it seems to remain in

¹ Guthrie on Gunshot Wounds, p. 254.

² Carmichael, Observations on varix and venous inflammation, in Trans. of King's and Queen's Coll. of Physicians in Ireland, vol. ii. p. 348.—Bouillaud, Revue Medicale, Juin 1825, p. 424.

³ Gendrin, Histoire Anatomique des Inflammations, tome ii. p. 468, et seq.

⁴ Kaltenbrunner, sur les changemens que subit la circulation du sang dans les parties saines et inflammées. Magendie, Jour. de Phys. t. viii. p. 81, et seq.

the system, poisoning the circulation, and inducing typhoid symptoms, which are rapidly fatal. The vitiation of the circulating fluid in cases of purulent deposition, is indicated by the peculiar yellow colour of the skin, as well as the change in the properties of the blood itself, which is dark-coloured, and does not coagulate. The poisoning of the system is rendered still more probable, by our finding similar symptoms developed in the case of poisoned wounds received in dissection, &c.¹ The effects, too, of the injection of pus into the veins of the lower animals, in the experiments of Baglivi, Magendie, Gaspard, and Dance, would tend to confirm this opinion.²

The pus found in the circulation can undoubtedly in many cases be traced to phlebitis, which has been shown by Arnott and Dance to exist more frequently than we were previously aware. In other cases, again, where, after careful and minute examination, no venous inflammation could be detected, we must, along with Velpeau and others, have recourse to absorption as the cause. Absorption of morbid matters is allowed by most physiologists, and the rapidity of the absorption seems to depend much on the depression of the vital ener-

¹ Arnott in *Medico-Chir. Trans.* vol. xv. p. 57.

² *Mag. Jour. de Phys.* t. ii. &c.—*Arch. Gen.* t. xix.

gies of the frame, which in the disease now under consideration, is always very great.

I do not therefore agree with the authors who suppose that phlebitis is always present, and a necessary precursor of purulent deposition. The existence of phlebitis, while it frequently indicates a peculiarity of constitution, and a proneness to be affected by trivial operations, is undoubtedly a source of very great irritation, and hence is likely to lead to inflammatory action. “Veins,” says Mr. Travers, “are indisposed to inflame, but when they do, they produce great irritation, and the constitution sympathizes deeply.” We need not therefore be surprised that inflammation and deposits of pus should occur after phlebitis, whether arising from the wound or ligature of a vein.¹

Purulent deposits, we have already seen, are in some cases surrounded with marks of inflammation easily recognised by the most inattentive observer, while in others the inflammation is not at all ob-

¹ Notwithstanding the bad consequences so generally attributed to ligature of veins, the French surgeons perform this operation for varix and after amputation with impunity. I have seen Baron Larrey tie the veins of a stump in the Hotel des Invalides, without producing any peculiar irritation. Dr. Hennen says, that he has repeatedly put ligatures on veins without any bad results.

vious, and there are scarcely any symptoms during life, or any appearances on dissection to indicate its presence. Such cases as the latter have led Velpeau to adopt his theory, that the pus is passively deposited after having passed through the heart and blood-vessels, and that it has mechanically hollowed out the organ, by separating the tissue.¹ Such an explanation is inconsistent with our ideas of pathology, and would require very strong proofs for its adoption, more especially as we have examples of abscesses being formed rapidly without any evident inflammatory symptom, and where they could not be accounted for by metastasis, or the mere translation of pus. Thus, in a case mentioned by Sir George Ballingall, abscesses were formed in different parts of the limbs, without any evident marks of preceding inflammation, and almost without the patient's knowledge ;² tubercles, too, in the lungs, often pass through all their stages, without exhibiting distinct signs of inflammatory action either before or after death, and yet we would not ascribe the pus found in such cases to metastatic absorption. In diseases of the liver, Louis states that abscesses are frequently found of large size, without being attended with any marked inflammatory symptoms, and where

¹ Velpeau, *Elements de Méd. Op.* Introd. p. 43.

² Second Clinical Lecture, July 1827.

no suppuration existed in any other parts.¹ The same fact is mentioned by Sir George Ballingall in his work on the Diseases of India.² Whether such abscesses are owing to inflammatory action or not, they cannot, at all events, be ascribed to the translation of pus, and hence in the case of purulent deposits, the mere absence of the signs of inflammation is no reason for attributing them to metastatic absorption. Besides, Sabatier remarks, that when, in the case of a small wound we find in the viscera more pus than the wound could have furnished, which is often the case, then the doctrine of the translation and mere passive deposition of pus will not apply, and we must, even if we support Velpeau's theory, allow that the pus afterwards irritates the part and leads to an increased secretion, or, in other words, to a degree of inflammation.³

I am therefore disposed to agree with Dance in believing, that purulent deposits are in general owing to a degree of inflammatory action frequently of a peculiarly obscure nature, and rendered still more insidious by the state of the patient at the time. For it must be remembered, that purulent deposits often take place a day or two, and some-

¹ Repertoire d'Anatomie, tome i. p. 129.

² Page 96.

³ Sabatier, Thèse Citée.

times only a few hours, before death, at a time when the patient is nearly unconscious of pain. In typhus fever, a fever similar to that which accompanies purulent deposition, effusion often takes place into the thorax without the usual symptoms of pleurisy, and we are astonished after death, if we have not made use of percussion and auscultation, to find what has taken place.

Purulent deposits take place with amazing rapidity. This, indeed, may be considered as a characteristic feature of them. In Case I, the pus in the knee-joint was certainly formed within thirty-six hours of the patient's death. In another case, mentioned by Dr. Hennen, a large deposit of pus took place in an equally short period of time. This may perhaps be accounted for by the mixture of pus with the circulating fluid.

To recapitulate what has been stated:—In the cases under consideration, there is a suppurating wound, or one which does not heal by the first intention, exciting constitutional irritation, which is more or less violent according to the state of the patient, and which gives rise to inflammation in different situations, more especially those which are weakest and most liable to disease. The inflammation thus excited is often of a very insidious nature, passes rapidly into suppuration, and

is attended with typhus or adynamic fever, which generally proves rapidly fatal. The purulent matter which has been detected in the circulation, and which, in some cases, is ascribed to phlebitis, in others to absorption, may account for the changes which take place in the blood, as well as for the peculiarity of the fever and of the suppuration.

Such are the views which I conceive to be most consonant with the facts and phenomena which have been observed.

The accession of long continued rigors a few days after an operation, is always a most unfavourable symptom, as indicating either the actual development of purulent deposits, or such a condition of the system as leads to their formation. When purulent deposits have taken place, we shall find, Mr. Rose says, the truth of the observation of Desault, that they are almost invariably fatal. This is a statement which is corroborated by all the authors who have written on the subject. And “ we cannot conceive a more humiliating spectacle to any one who prides himself on the powers of his art, than being compelled to stand by and watch the progress of a malady like this, a malady which he just possesses tact enough to know, but not the least power to cure. So, however, it is, that all

the plans which have hitherto been employed, whether depletory or stimulant, have totally failed." It becomes then of paramount importance for the surgeon, to endeavour to prevent the formation of these deposits, and in no way I conceive can this be better effected than by healing all wounds, as far as possible, by the first intention; for it will be seen, that in all the cases I have mentioned this has not taken place, either on account of the mode of dressing the wound, or on account of the peculiar state of the patient at the time. In particular constitutions and states of the body, all the efforts of the surgeon to effect immediate union will be unavailing, and hence, before attempting to operate, he ought to study well the habits of his patient, and to attend particularly to the treatment both before and after the operation. In irritable habits, where there is any weak part, or any important organ which has either been previously affected, or is predisposed to disease, it becomes very doubtful whether any operation should be attempted, and a medical man will often display more true surgical knowledge and information in such cases by declining or delaying an operation, than by undertaking its performance.